The views expressed here are those of the authors and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.
Roadmap

I. Benchmarking CESEE infrastructure

II. Macroeconomic effects of infrastructure investment

III. Getting the most from infrastructure investment and minimizing risks

- Enhancing infrastructure governance: public investment and risk management
- Strengthening private participation
- Coordinating investment across CESEE
I. Benchmarking CESEE Infrastructure
CESEE countries have only half of the per capita capital stock available in EU15

Sources: IMF, Fiscal Monitor database; WDI; WEO; IMF staff calculations.
Note: Bars indicate the weighted average in each country group. CESEE-EU includes Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Slovenia. Large emerging markets (EM) includes Russia, Turkey, and Ukraine. Western Balkans plus includes Albania, Belarus, Bosnia and Herzegovina, Kosovo, Moldova, Montenegro, North Macedonia, and Serbia.
Investment needed to close infrastructure gaps are large. Even more necessary to close gaps in quality and make infrastructure stock climate-sensitive.

<table>
<thead>
<tr>
<th></th>
<th>Our estimates</th>
<th>Beyond the Gap (World Bank)</th>
<th>Global Infrastructure Hub (A G20 Initiative)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
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<tr>
<td>CESEE</td>
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<tr>
<td>% of GDP/year</td>
<td>8.4</td>
<td>7.0</td>
<td>2.8</td>
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<tr>
<td>Total cost by 2030 (billion USD)</td>
<td>3670</td>
<td>3063</td>
<td>1237</td>
</tr>
</tbody>
</table>

Note: Our estimates: Gaps in roads and railways are assessed in km per total land in column A, per arable land in B, and per population in C. The preferred estimate for Beyond the Gap assumes the following policies: Invest now in renewable energy, energy efficiency; Increase the utilization rate of rail and public transport; densify cities; promote electric mobility. The high spending scenario assumes the following policies: no investment in energy efficiency; fossil energy for 10 years followed by a switch to low carbon; allowing cities sprawling; favoring rail investments without accompanying policies. The low spending scenario assumes the following: high energy efficiency and demand management; increasing use of rail and public transport; densifying cities; reducing demand for transport through gasoline taxes.
II. Macroeconomic Effects of Infrastructure Investment
A. Empirical Estimates
Public investment booms are associated with a significant increase in output

Sources: Fiscal Monitor; WEO; IMF staff estimates.
Note: Cumulative response of GDP growth (left) and public investment as percent of GDP (right) following public investment boom episodes. The episode is normalized such that public investment as percent of GDP increases by 1 ppt on impact. $t = 0$ is the year of the shock; dashed lines denote 90 percent confidence bands. The implicit multiplier on impact is about 1.7.
B. Model Simulations
### Model simulations of infrastructure investment

<table>
<thead>
<tr>
<th>Motivation</th>
<th>IMF’s Globally Integrated Monetary and Fiscal Model GIMF</th>
</tr>
</thead>
</table>
| • Trace the effect of public investment in general equilibrium framework  
• Consider the role of the efficiency of public investment  
• Assess consequences of alternative modes of infrastructure financing  
• Examine spillovers from regional coordinated investment projects | • Multi-country model  
• Stylized public sector (taxes, spending, public investment, public debt)  
• Public capital in the production function  
• Assumption on efficiency of public spending |
Simulations using the IMF’s Globally Integrated Monetary and Fiscal (GIMF) model

Shock

- Infrastructure investment is increased by 1 percent of GDP for 10 years

Scenarios

- Higher efficiency of public spending

Not shown (in background section)

- Cross-border projects that improve regional connectivity and lower trade barriers
- Alternative modes of financing (public debt accumulation, higher consumption taxes, lower public consumption)
Infrastructure investment: the role of public sector efficiency

Sources: IMF staff calculations.
Note: CESEE-EUb Region includes Bulgaria, Croatia, Czech Republic, Hungary, Poland and Romania.
Takeaways from empirical findings and model simulations

• The impact of higher infrastructure investment on CESEE can be significant. Raising infrastructure investment by 1 percent of GDP for 10 years can boost real GDP up by to 2.5 percent at the end of the horizon.

• Higher efficiency of infrastructure investment is essential to maximize the benefits.

• Coordinated cross-country infrastructure investment, which improves connectivity and lowers trade costs, could magnify the macroeconomic gains.

• The pace and type of financing is critical for dynamics of public deficits and debt.
III. Getting the Most from Infrastructure Investment
The COVID-19 crisis raises the need for more and better public investment to boost short-term growth and potential output

- Strong call for public investment to support the recovery from the pandemic
- A key tool due to its high multiplier, and discretionary and lumpy nature
- Could crowd in private capital amid high uncertainty
- Essential to accelerate the green and digital transformation

Policy Implications

- Strengthen infrastructure governance to achieve more effective and integrated public investment and risk management (esp. for PPPs) and get the most out of taxpayers’ money
- Reprioritize capital spending towards well-planned, selected, and implemented projects that can enhance long-term resilience (e.g., green and digital infrastructure), including upgrades
- Review capacity constraints and identify potential for cross-border collaboration
A. Enhancing Infrastructure Governance: Public Investment and Risk Management
IMF Public Investment Management Assessments (PIMA) indicate significant scope for improving infrastructure governance in CESEE, with large variation across countries.

Source: IMF staff calculations based on Public Investment Management Assessments (PIMA) completed as of March 2020.
A novel IMF survey on infrastructure investment in CESEE complements these PIMA findings
According to survey, there are still sizable gaps in fiscal risk analysis and management in most CESEE countries.
B. Strengthening Private Participation
In CESEE, the private sector is involved mostly in economic infrastructure, where SOEs are also more prevalent.

Infrastructure Survey of CESEE Authorities: Project Ownership by Sector (Percent)
PPPs are the main channel for private participation in infrastructure investment in CESEE, but their relevance has declined.
Regulatory, legal and political risks are major bottlenecks to private participation in CESEE infrastructure projects

Infrastructure Survey of CESEE Authorities: Sources of Risk for Private Investors

(Percent)
There is a lack scalable and more comprehensive risk mitigation in CESEE, with most countries offering guarantees only

Infrastructure Survey of CESEE Authorities: Risk Mitigation Instruments for Private Investors (Percent)
C. Coordinating Investment across CESEE
Compared to national projects, many risks are more elevated in cross-border projects, especially implementation delays and cost overruns...

**EUR Infrastructure Survey: Risk Factors in Infrastructure Projects**

(Percent)

- Implementation delays
- Change in scope/design of project
- Cost overruns
- Changes in regulations
- Revenue risk (e.g., demand shortfalls)
- Coordination issues
- Funding shortfall

Sources: country authorities and staff calculations.
... which may explain why private participation is lower in cross-border projects compared to national ones.

Infrastructure Survey of CESEE Authorities: Projects by Ownership
(Percent)
Nonetheless, there are many successful cross-border projects, with the EU framework as critical factor

**SUCCESSFUL**

- Simple but critical project (energy, transport)
- Clear payoffs for each country
- Adherence to international standards
- Coordination via EU framework

(CZE and POL)
- Water management along the border
- Co-financed by EU grants

(CZE and POL)
- Rail line between Katowice and Ostrava
- Co-financed EU grants

(ROM and MDA)
- Natural gas pipeline
- Co-financed by EU grants and PPP with Romanian SOEs

**CHALLENGING**

- Coordination challenges causing delays in project implementation
- Difficult/lengthy negotiations
- Relatively small scale (even for EU TEN-T and InvestEU)

(CZE and AUT)
- Motorway D52 between Brno and Vienna

(POL and BLR)
- Cross-border Domaczewo bridge project
D. Enhancing Resilience and Supporting Climate Action
CESEE region will require additional public and private resources to achieve the desired “green and digital” transition

- COVID-19 lessons and recovery: (1) enhance long-term, socio-economic resilience and (2) “build better” (i.e., climate change mitigation and adaptation)
- Reliable telecommunications/digital services, education and health care
- Facilitate the “green” transition (renewable energy generation, low-emission transport, and energy efficiency)
- Mitigate the impact of natural disasters and progressive global warming
- Still large infrastructure gaps despite considerable NGEU resources (up to €212 billion of grants and loans (~6% of GDP)) and ambitious plans for green infrastructure and digitalization
- Additional “green” investment of ~1.5% of GDP per year (comparable to the required capital spending for reaching 50 percent convergence with the EU15)
Conclusions
Conclusion

• Relative to EU-15, CESEE falls short both in terms of per-capita public capital and various measures of physical infrastructure quantities, with considerable cross-country variation

  ➢ Filling 50% of the gap will require significant investment (3-8% of GDP for 10 years)

• Scaling-up infrastructure investment is important to support the post-COVID19 recovery and speed up convergence

  ➢ Getting the most of this investment would require better “infrastructure governance”, recognizing significant difference across countries → IMF PIMA can help identify shortcomings

  ➢ The crisis also presents an opportunity to enhance long-term resiliency by shifting towards green and digital infrastructure

• Attracting private participation will be essential but requires better risk allocation and more effective fiscal risk management, especially in PPPs → IMF PPP Fiscal Risk Assessment Tool (P-FRAM) can provide guidance

• Cross-border projects involve coordination challenges but could yield greater growth dividends if they improve regional connectivity and integration
Background Slides
Reference

## Sub-regions used in GIMF

<table>
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<tr>
<th>Region 1:</th>
<th>Region 2:</th>
<th>Region 3:</th>
<th>Region 4:</th>
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<tr>
<td>CEE-euro area</td>
<td>CEE-EU</td>
<td>Western Balkans</td>
<td>Large Emerging</td>
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<td>CE</td>
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<td>Moldova</td>
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- Rest of the Eurozone
- Rest of the World
Infrastructure investment: the role of financing

Alternative Infrastructure Financing: SE Region

Sources: IMF staff calculations.
Infrastructure investment: the role of cross-border coordination

Sources: IMF staff calculations.